

**INDEPENDENT OVERSIGHT  
REVIEW OF SELECTED ELEMENTS OF  
EMERGENCY MANAGEMENT  
AT THE  
OAK RIDGE NATIONAL LABORATORY**

**July 2011**

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## Acronyms

AAR	After-Action Report
ACTS	Assessment and Commitment Tracking System
AMEM	Assistant Manager for Environmental Management
BJC	Bechtel Jacobs Company, LLC
CAAM	Continuous Alpha Air Monitor
CAPARS	Computer Assisted Protective Action Recommendation System
CAT	Consequence Assessment Team
DDFO	Deputy Director for Field Operations
DOE	U.S. Department of Energy
dpm	Disintegrations per Minute
EAL	Emergency Action Level
EM	Environmental Management
EMD	Emergency Management Department
EOC	Emergency Operations Center
EnergX	EnergX TN, LLC
EPHA	Emergency Planning Hazards Assessment
EPI	Emergency Public Information
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
FM	Facility Manager
FY	Fiscal Year
HAZMAT	Hazardous Materials
HMMIS	Hazardous Materials Management Information System
HQ	Headquarters
HSS	Office of Health, Safety and Security
JIC	Joint Information Center
LEM	Local Emergency Manual
LSS	Laboratory Shift Superintendent
MAR	Material at Risk
OFI	Opportunity for Improvement
ORNL	Oak Ridge National Laboratory
ORO	DOE Oak Ridge Office
OROC	Oak Ridge Operations Center
OROEOC	DOE Oak Ridge Office Emergency Operations Center
ORR	Oak Ridge Reservation
OSO	DOE ORNL Site Office
RCT	Radiological Control Technician
SBMS	Standards Based Management System
SC	DOE Office of Science
SC-31	DOE SC Office of Safety, Security and Infrastructure
SC-31.1	DOE SC Environment, Safety and Health Division
SCMS	Office of Science Management System
SSEMMS	Safeguards Security and Emergency Management Management System
TEMA	Tennessee Emergency Management Agency
TRU	Transuranic
UT-Battelle	University of Tennessee-Battelle, LLC

# **INDEPENDENT OVERSIGHT REVIEW OF SELECTED ELEMENTS OF EMERGENCY MANAGEMENT AT THE OAK RIDGE NATIONAL LABORATORY**

## **1.0 INTRODUCTION**

The U.S. Department of Energy (DOE) Office of Health, Safety and Security (HSS), Office of Independent Oversight, performed a review of specific portions of the emergency management program at Oak Ridge National Laboratory (ORNL) between September and November 2010. The focus of this review was to verify the status of corrective actions from the 2008 HSS emergency management inspection, assess two recent after-action reports for two actual events, and assess both the DOE ORNL Site Office (OSO) and University of Tennessee-Battelle, LLC (UT-Battelle) self-assessment and issues management programs. The scope of this review was agreed upon by HSS, OSO, and UT-Battelle, the prime contractor responsible for the emergency management program at ORNL.

The recommendations provided in this report are not intended to be prescriptive or mandatory. Rather, they are to be reviewed and evaluated by the responsible DOE site office and applicable contractor line management and accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and current priorities.

HSS reviewed the corrective actions taken to address the eight findings contained in the October 2008 report of the Independent Oversight inspection of emergency management at ORNL. HSS also reviewed two recent ORNL emergency incident after-action reports (AAR) to determine the ability of OSO and UT-Battelle to identify performance issues and subsequently develop and execute corrective actions to address the performance issues identified within the AAR. One of the incidents was at a facility under the purview of the Office of Environmental Management, so only the UT-Battelle activities in response to this event were evaluated, as agreed upon during scoping. Both of these AAR reviews focused on the analysis of the issues, the alignment of the corrective actions with the analysis, the quality of the documentation used to close the corrective actions, and the definition and performance of effectiveness reviews. HSS also reviewed the OSO and the UT-Battelle Emergency Management Department (EMD) processes for assessing their emergency management programs and resolving the issues identified by these assessments. In addition, HSS examined the implementation of the OSO and UT-Battelle EMD assessment and issues management processes to determine whether the processes were adequately accomplished.

Section 2, Review Summary, provides a perspective on the ORNL emergency management program, summarizes the assessment activity results, and identifies various positive attributes and areas for improvement in each of the four general areas that defined the core assessment activities. Section 3, Programmatic Recommendations, provides Independent Oversight's key recommendations for improving emergency management performance at ORNL. Appendix A provides supplemental information about the review, and Appendices B through M provide further details and insights for OSO and UT-Battelle emergency management program personnel.

## 2.0 REVIEW SUMMARY

The focus of this review was to verify the status of corrective actions from the 2008 HSS emergency management inspection, assess two recent AARs for two actual events, and assess both the DOE ORNL Site Office (OSO) and University of Tennessee-Battelle, LLC (UT-Battelle) self-assessment and issues management programs.

OSO and UT-Battelle personnel have applied effort and resources to address the findings from the 2008 emergency management inspection, learn from emergency incidents, and assess their respective programs. HSS observed numerous effective processes and behaviors during the review that reflect a healthy, safety-focused, and continuous learning environment within the ORNL emergency management program.

### 2.1 Status of 2008 HSS Emergency Management Inspection Findings

Independent Oversight assessed the actions taken to address the eight findings issued from the 2008 HSS Emergency Management Inspection report. Five of the findings were appropriately analyzed and correction actions were appropriately defined and executed. Actions were not complete for one finding and issues were noted by HSS for the two remaining findings:

- Finding #2 stated that EnergX TN, LLC emergency planning hazards assessments (EPHAs) had not incorporated maximum allowable limits on hazardous quantities to ensure the determination of appropriately conservative protective actions and protective action recommendations. The corrective actions that were completed deviated from the agreed upon corrective action plan. OSO managers identified this deviation during a closeout review, and implemented corrective actions to address this issue effectively.
- Finding #7 stated that ORO had not conducted full assessments of the contractor's emergency management and self-assessment programs for environmental projects at ORNL, as required by DOE Order 151.1C, *Comprehensive Emergency Management System*. The closure files for this finding lacked enough evidence to demonstrate that ORO's assessment activities had sufficient scope and depth and also did not provide assurance that ORO assessments would continue.
- Finding #8 stated that SC had not implemented effective corrective actions to ensure periodic evaluations of the ORO and ORNL emergency management program elements, as required by DOE Order 414.1C, *Quality Assurance*, and DOE Order 151.1C. SC correctly concluded that it had not institutionalized this requirement within its processes; however, the final corrective action – scheduling the required evaluations – is not scheduled for completion until September 30, 2011.

Independent Oversight is concerned that a timely overall effectiveness review of the actions taken to address the findings has yet to be conducted. By OSO process, an overall effectiveness review *is performed when* all corrective actions defined to address all findings are completed. Because Finding #8 remains open, OSO has not conducted the effectiveness reviews for the other seven findings, which are specific to site performance issues. Because the open corrective actions associated with finding eight are associated with SC, and not the site, Independent Oversight concludes the intent for the OSO overall effectiveness review are met and that OSO should conduct this assessment now.

## **2.2 ORNL After-Action Reports**

ORNL uses a “lead and event contractor” concept of operations for emergency planning and response. UT-Battelle is the lead contractor, while other onsite contractors (e.g., Bechtel Jacobs Company, LLC) are event contractors. As the lead contractor, UT-Battelle coordinates all emergency response operations within the ORNL complex. For event contractor facilities within the ORNL complex, UT-Battelle is the first responder to provide emergency response and emergency management services; the event contractor is responsible for supporting incident command and site response, including support of event classification, worker protection, mitigation, and technical support. Event classification support requires the event contractor facility/building manager or designee to provide event scene indicators needed for the Laboratory Shift Superintendent (LSS) to apply emergency action levels. In addition, personnel in event contractor facilities are required to make notifications of abnormal or emergency events to the LSS, including the location of the event, a description of the event, the possibility of a hazardous material release, and the identification of possibly injured or contaminated personnel.

Overall, the two UT-Battelle after-action reports that HSS reviewed indicate a good awareness of performance issues by both UT-Battelle and OSO, as well as a desire for continuous performance improvement within the emergency management program. HSS noted that UT-Battelle and OSO did not recognize that DOE Order 151.1C requires that an event must be categorized as an Operational Emergency as promptly as possible, but no later than 15 minutes after the event is recognized, identified, or discovered. LPD-EM-ADM-0410, *Event Categorization and Classification*, appropriately captures this requirement for event categorization; however, it incorrectly interprets that discovery as “when the LSS is notified by facility personnel or alarm,” rather than when personnel in a facility discover an event that could cause the declaration of an emergency. HSS noted a related issue regarding the emergency management drills that event contractors conduct at their facilities. The drill scenarios do not always involve Operational Emergencies that require notifications and classification by the LSS, so they may afford too little interaction and practice between the LSS and the event contractors.

## **2.3 OSO and UT-Battelle Assessment and Issues Management Processes**

In general, OSO has suitable processes in place for self-assessments and assessments of the contractor emergency management program. The processes are appropriately documented and notably require that objective evidence be provided in sufficient detail both to reconstruct the activity being observed and to describe the inspection logic. Additionally, SC requires the OSO assessment program to be independent of the contractor’s oversight activities in order to maintain an unbiased understanding of the effectiveness of the contractor assurance system. Further, the OSO issues management process contains the steps necessary for an effective program, including preventing recurrence of findings and closing corrective actions based on standard methods. As OSO begins the effectiveness review for the seven findings from the 2008 inspection that have been resolved, OSO should recognize that the evaluation criteria used for self-assessments are incomplete, in that the criteria are based on an OSO procedure that does not include all elements of the OSO emergency management program. In addition, OSO assessment reports do not consistently document enough objective evidence to support a determination that evaluation criteria were met and do not demonstrate that the OSO assessment is independent of the contractor’s assessment activities. Furthermore, OSO has not yet sent one finding, identified over nine months ago, to the contractor for resolution.

The Emergency Management Department issues management process is comprehensive and includes detailed instructions for most steps of the process. Additionally, corrective actions are assigned appropriate due dates, developed to cover all aspects of the issue and prevent recurrence, and closed properly in most cases. EMD has also established a comprehensive process for conducting self-assessments that includes appropriate evaluation criteria, performance-based assessments, and an internal

quality review process upon completion. However, HSS noted several areas where the assessment and issues management processes could be more effective. In a few cases, the closure evidence for a completed corrective action did not describe the action that was taken or whether the action had been completed. Additionally, the assessment process does not clearly specify the level of detail for documenting objective evidence, does not require any training for assessors, and does not clearly explain the reason for internal staff reviews of completed assessments. Furthermore, the narrative format of the assessment reports does not support linking objective evidence to particular evaluation criteria or prompting the assessor to include observations about performance or implementation of requirements.

### **3.0 PROGRAMMATIC RECOMMENDATIONS**

Independent Oversight provides the following recommendations, which represent the most significant opportunities for improving the ORNL emergency management program. The recommendations are not intended to be prescriptive or mandatory. Rather, they are to be reviewed and evaluated by the responsible DOE site office and applicable contractor line management and accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and current priorities.

#### **Onsite and Offsite Notifications**

- To improve the timely communication of protective actions, revise procedure LPD-EM-ADM-0410, *Event Categorization and Classification*, to define event “discovery” as when an abnormal event is recognized/identified/discovered by facility personnel or the LSS, not when the LSS is notified.
- To improve the effectiveness of communication between the LSS and reporting personnel, ensure that annual facility-level exercises at EPHA facilities use hazardous material release scenarios that will initiate an Operational Emergency response.
- To improve the timely issuance of news releases and employee communications, minimize the number of key individuals involved in review and approval.

#### **OSO Assessment and Issues Management Processes**

- Enhance the OSO self-assessment program’s ability to identify and correct weaknesses in the emergency management program by modifying the self-assessment evaluation criteria to include the relevant criteria from DOE Guide 151.1-3, Appendix D and expanding the self-assessment program to evaluate OSO staff performance of ORNL emergency operations center team duties.
- Improve the documentation of assessment reports by noting the objective evidence used to determine whether criteria were met or not met.

#### **UT-Battelle Assessment and Issues Management Processes**

- Strengthen the EMD issues management process by including more detailed criteria for determining acceptable resolution of issues, requiring objective evidence for closure of all issues, and documenting the rationale if no action is taken for an issue.



## APPENDIX A

### Supplemental Information

#### A.1 Dates of Review

Scoping Visit	September 20-21, 2010
Planning Visit	October 20-12, 2010
Onsite Data Collection Visit	November 01-10, 2010
Report Validation and Closeout	March 23, 2011

#### A.2 Review Team Composition

##### A.2.1 Management

Glenn S. Podonsky, Chief Health, Safety and Security Officer  
William A. Eckroade, Deputy Chief for Operations, Office of Health, Safety and Security  
John S. Boulden III, Acting Director, Office of Independent Oversight and Office of Enforcement  
Steven C. Simonson, Director, Office of Emergency Management Oversight

##### A.2.2 Quality Review Board

William A. Eckroade, Deputy Chief for Operations, Office of Health, Safety and Security  
John S. Boulden III, Acting Director, Office of Independent Oversight and Office of Enforcement  
Michael A. Kilpatrick  
George E. Armstrong

##### A.2.3 Review Team

David Mohre, Jr. (Team Leader)  
John Bolling  
J.R. Dillenback  
Deborah Johnson  
Teri Lachman  
Thomas Rogers

## APPENDIX B

### Status of 2008 Finding #1

#### B.1 Finding Statement

The University of Tennessee-Battelle, LLC (UT-Battelle) screening process does not ensure that hazardous chemicals stored in multiple, small, co-located containers are appropriately evaluated for inclusion in an emergency planning hazards assessment, as required by U.S. Department of Energy (DOE) Order 151.1C, *Comprehensive Emergency Management System*.

#### B.2 Summary of Issues Leading to Finding

UT-Battelle had not developed a formal process or procedure to provide guidance for the hazardous screening process involving the storage conditions of multiple, small, co-located containers. Specifically, the hazards survey for Building 7925A did not capture the fact that three hundred 2.5-liter bottles of hydrochloric acid were co-located because the hazards survey compilation process only considered the size of individual containers.

#### B.3 Summary of Corrective Actions

UT-Battelle corrective actions consisted of revising the hazards survey instruction document and developing an emergency management procedure for performing and documenting the hazardous material screening process in the facility-specific hazards surveys. Additionally, UT-Battelle developed a second pre-screening program identified in the Hazardous Materials Management Information System (HMMIS) to ensure that hazardous chemicals stored in multiple, small, co-located containers are identified.

#### B.4 Observations

UT-Battelle emergency management personnel revised the hazards survey instruction document to include a statement from the DOE *Emergency Management Guide* concerning the screening of large, co-located quantities of smaller containers of hazardous chemicals that, unless added together, would be screened out from further analysis. Additionally, emergency management personnel developed, approved, and issued a clearly-defined emergency management procedure, *Hazardous Materials Identification and Screening*, to establish monthly hazardous materials reviews documented in a *DOE Order 151.1C Report* and to formally document the results of the reviews. The procedure incorporates the requirements of DOE Order 151.1C and includes a requirement to use HMMIS to prepare a second pre-screening report on the hazardous chemicals, called the *151.1C Management Inventory Summary Report*. This report lists all the hazardous chemicals stored in multiple, small, co-located containers. Based on the enhanced screening process, UT-Battelle reviewed its hazards surveys and determined that they all required revision to capture inventories of the hazardous chemicals stored in multiple, small, co-located containers. UT-Battelle revised and issued the hazards surveys, and the enhanced screening process identified that none of the applicable facility emergency planning hazards assessments (EPHAs) required revision.

#### B.5 Overall Conclusion

The implementation of the internal procedure, the secondary pre-screening process in HMMIS, and the revision of the UT-Battelle hazards surveys to meet the intent of DOE Order 151.1C have effectively addressed the weaknesses identified in this finding. UT-Battelle completed the action deliverables identified in the corrective action plan for this finding and appropriately closed the finding.

## **B.6 Recommendations**

None.

## APPENDIX C

### Status of 2008 Finding # 2

#### C.1 Finding Statement

The EnergX TN, LLC (EnergX) EPHA does not incorporate maximum allowable limits on hazardous material quantities to ensure the determination of appropriately conservative protective actions and protective action recommendations, as required by DOE Order 151.1C.

#### C.2 Summary of Issues Leading to Finding

In 2008, during a walk-down of the Transuranic (TRU) Waste Processing Center warehouse, which is used to stage radioactive material waste drums, Independent Oversight observed that the building is an open space; therefore, there is no means to take credit for segmentation in the planning consequence analysis. However, the EPHA only considered a small fraction of the total hazardous material inventory as the material at risk (MAR) for an aircraft crash scenario, rather than the allowable building limit.

#### C.3 Summary of Corrective Actions

The causal analysis attributed the inadequacy of the MAR quantity to a lack of clear understanding and communication of requirements between EnergX (the operator of the TRU Waste Processing Center) and the DOE Oak Ridge Office (ORO). Although EnergX and ORO thought they had a common understanding for the EPHA analyses, the approach was not documented and led to non-conservative EPHA results that ORO did not initially recognize. To address this condition, a corrective action plan was developed, focusing initially on an agreement of the MAR to be used in the EPHA consequence analysis, followed by the inclusion of the results in the emergency action levels (EALs) and emergency planning zone (EPZ) document.

The specific actions and deliverables were:

- Action #1 (EnergX). Meet with ORO Emergency Management/Oak Ridge National Laboratory (ORNL) Emergency Management staff to develop a common understanding of the requirements. Meeting minutes will serve as the closure record and document the agreed upon MAR quantity.
- Action #2 (ORO). Provide familiarization training to ORO and EnergX personnel on MAR quantities used for consequence assessments in the EPHA. The emergency management guide will be the basis for the training. A lesson plan and attendance records will serve as closure records.
- Action #3 (EnergX). Revise the EPHA consequence analysis using the revised MAR quantity. The revised EPHA will serve as the closure record.
- Action #4 (EnergX). Submit the revised EPHA to DOE for approval. A letter from EnergX to ORO requesting approval of the revised EPHA will serve as the closure record.
- Action #5 (ORO). Receive approval of the revised EPHA from ORO. An approval letter from ORO will serve as the closure record.

- Action #6 (EnergX). Revise EALs to reflect the revised EPHA consequence analysis. The revised EAL will serve as the closure record.
- Action #7 (UT-Battelle). Revise the ORNL EPZ document, ORNL/LPD-EP/EPZ-001, to incorporate results from the revised TRU Waste Processing Center EPHA. The ORNL EPZ document will serve as the closure record.

#### **C.4 Observations**

- Action #1. The evidence file contained minutes from a December 9, 2008, meeting with EnergX personnel and ORO in attendance. The meeting minutes documented a task for EnergX to better describe the MAR quantities in the EPHA, rather than an agreement on the MAR quantity.
- Action #2. No training module was prepared; however, one record documented 1250 curies as the MAR quantity, and attendance records indicated that EnergX and ORO personnel were present to agree on that MAR quantity. This was the same MAR that was noted as incorrect during the 2008 inspection. The MAR was subsequently changed to match the allowable building limit of 2500 curies.
- Actions #3, #4, and #5. DOE approved revision 4 of the EPHA. The current EPHA includes an aircraft/extreme malevolent scenario that uses the maximum allowable building inventory quantity of 2500 curies.
- Action #6. UT-Battelle revised the applicable EAL and distributed the revised EAL to the controlled EAL sets. The EALs sets at the emergency operation center (EOC), the laboratory emergency response center, and the Fire Department command vehicle were verified to have the current version of the EAL.
- Action #7. UT-Battelle incorporated the result of the revised TRU Waste Processing Center EPHA into the ORNL EPZ document.

#### **C.5 Overall Conclusion**

The completion of the corrective actions resulted in an analysis consistent with the DOE policy contained in DOE Order 151.1C. The EPHA analysis included an aircraft/malevolent act scenario that considered the worst-case MAR quantity and used the results of the analysis in the EAL and EPZ document. However, the corrective actions deviated from the corrective action plan, and the evidence files do not fully reflect how the 2500 curies MAR was established. It appears that the 1250 curies was incorrectly agreed upon during the EnergX and ORO meeting and that corrective actions proceeded using a non-conservative MAR quantity until other DOE managers identified the discrepancy during the review and approval process.

#### **C.6 Recommendations**

There are no recommendations regarding the TRU Waste Processing Center EPHA or EAL, or the ORNL EPZ document. However, for future corrective actions and policy questions, consider the following.

- Improve the accuracy of the closure evidence files by documenting the actual actions taken to correct program weaknesses, particularly if the actions are inconsistent with the corrective action plan or other records used to document the completion of the corrective action plan.

- When there are questions regarding DOE emergency management policies, consider including DOE Office of Emergency Management (NA-40) personnel in the discussions and seeking an official interpretation. For discussions related to Office of Health, Safety and Security (HSS) findings, consider including HSS personnel in the discussions as appropriate.

## APPENDIX D

### Status of 2008 Finding #3

#### D.1 Finding Statement

The offsite notification process does not ensure that consistent, timely, and accurate information is provided for upgraded events, as required by DOE Order 151.1C.

#### D.2 Summary of Issues Leading to Finding

The offsite notification process did not always ensure that timely and accurate information was provided consistently to offsite agencies, particularly when the event classification or emergency conditions changed. The process for conducting notifications to offsite agencies required the laboratory shift superintendent (LSS) to fill out a notification form and then verbally notify the state, the city of Oak Ridge, and the Oak Ridge Operations Center (OROC) duty officer. The OROC duty officer then completed a separate notification form, verbally notified the DOE Headquarters (HQ) Watch Office, and transmitted the form via facsimile to the DOE HQ Watch Office and state and local offsite agencies. However, the LSS internal operating procedure had several ambiguities in the responsibilities and processes for performing these notifications, particularly in applying them following the transfer of the emergency director function from the LSS to the EOC crisis manager. Furthermore, the process was overly complex, requiring several information exchanges to fully execute. The identified issues included:

- There was no mechanism to ensure that the written notification form sent to offsite agencies by the OROC duty officer was consistent with the information provided verbally by the LSS.
- The requirement within the LSS verbal notification step to notify “DOE” within 15 minutes of event classification does not indicate whether notifying the OROC duty officer within the specified time frame would meet the requirement (inasmuch as the DOE HQ Watch Office notification by the OROC duty officer is outside the direct control of the LSS).
- The EOC crisis manager checklist contained only very general guidance on providing an updated verbal notification to the state (and other appropriate stakeholders) every 60 minutes or as necessary.
- There was no reference to using the LSS to perform these notifications, no step to ensure that the LSS has all of the necessary information, and no check by the crisis manager or EOC staff that the LSS verbal notification was consistent with the actual event status.

#### D.3 Summary of Corrective Actions

- Action #1. Revise the LSS internal operating procedure for emergency operations that contains directives and tools for conducting initial notifications.
- Action #2. Reprogram the ring-down phone in the LSS office to add the DOE HQ Watch Office and the ORNL EOC coordinator.
- Action #3. Reprogram the LSS facsimile machine to send the initial notification form to a preset distribution that includes the DOE HQ Watch Office, Tennessee Emergency Management

Agency (TEMA) State EOC, city of Oak Ridge, and surrounding county local emergency planning committees.

- Action #4. Revise the emergency management procedure for offsite notification to include performing follow-up notifications when classification of the event is upgraded.
- Action #5. Revise applicable ORNL EOC checklists to include instructions for performing follow-up notifications when classification of the event is upgraded.
- Action #6. Train applicable staff on the revised offsite notification procedure and ORNL EOC checklist that includes instructions for performing follow-up notifications when classification of the event is upgraded.

#### **D.4 Observations**

All issues identified in the 2008 report were addressed, and the applicable procedures were revised. The completed actions included:

- The ring-down phone in the LSS office was reprogrammed with numbers for the DOE HQ Watch Office and the ORNL EOC coordinator, and the facsimile machine now has a preset distribution that includes the DOE HQ Watch Office, TEMA State EOC, city of Oak Ridge, and surrounding county local emergency planning committees.
- The emergency management procedure for offsite notification and the applicable ORNL EOC checklists include instructions for performing follow-up notifications as soon as practical when classification of the event is upgraded.
- Appropriate staff members were trained on the revised offsite notification procedure and the ORNL EOC checklist.

#### **D.5 Overall Conclusion**

UT-Battelle has appropriately revised the program, and the notification process is improved. The LSS has a ring-down “conference” call system connected directly to TEMA, the DOE HQ Watch Office, and local governments during a General Emergency. The emergency management database is being integrated so that sections of the notification and initial assessment forms are populated automatically as protective actions are determined. The Emergency Management Department (EMD) is developing a database that will allow sections of the notification and initial assessment forms to be populated automatically as protective actions are determined. This database will streamline the development and accuracy of the notification form, and UT-Battelle plans to implement use of the database in August 2011.

#### **D.6 Recommendations**

To increase the ability to notify offsite officials as soon as practical, reprioritize the steps in the LPD-EM-ADM-0510, *Offsite Notification*, procedure to ensure that the EOC coordinator informs the LSS of the upgrade before updating WebEOC™.



## APPENDIX E

### Status of 2008 Finding #4

#### E.1 Finding Statement

UT-Battelle and Bechtel Jacobs Company, LLC (BJC) have not conducted annual facility-level evaluations of the emergency response capability at facilities that have EPHAs, as required by the *UT-Battelle Emergency Management Drill and Exercise Program Procedure* and DOE Order 151.1C.

#### E.2 Summary of Issues Leading to Finding

The 2008 report recognized that, although BJC conducted emergency response drills at its occupied facilities during fiscal year (FY) 2007 and FY 2008, BJC did not conduct or document evaluations for all of the drills. A team of BJC personnel from the emergency management, project, and quality assurance organizations, along with representatives from EnergySolutions (a BJC subcontractor), was assembled to complete a causal analysis of the finding and to develop corrective actions deemed appropriate to prevent recurrence.

BJC procedure BJC-EP-3021, *Emergency Management Organization Program Description*, indicated how BJC implemented the emergency management program required by DOE orders and Federal and state regulations. The procedure identified programmatic requirements, described the roles and responsibilities of individuals and projects in meeting these requirements, and applied to BJC projects at ORNL. The procedure does not explicitly include the DOE Order 151.1 C requirement for an annual facility-level exercise and evaluation for facilities that are subject to the DOE operational emergency hazardous materials program. Further, the procedure assigns primary actions for the conduct and documentation of drills and exercises to BJC emergency management personnel deployed to support BJC projects. In instances where drills were planned and conducted at the facility level and a BJC subcontractor operated the facility, the roles and responsibilities to ensure that the requirements were met could be unclear in the absence of coordination between BJC and the subcontractor organization. Management assessments of the program elements within the project did not identify this issue before the 2008 inspection.

#### E.3 Summary of Corrective Actions

The corrective action plan to address this finding focused on revising the BJC emergency management program procedures to clarify requirements and responsibilities, revising a subcontractor agreement (between BJC and EnergySolutions) for the subcontractor to meet the BJC procedures, developing a schedule of drills, and training the drill coordinators on these requirements and expectations. Specific actions and deliverables were:

- Action #1 (BJC). Revise BJC procedure, BJC-EP-3021, *Emergency Management Organization Program Description*, to more clearly state that facilities subject to the DOE operational emergency hazardous materials program must exercise their emergency response capability annually and must include at least facility-level evaluation and critique. Additionally, the revision must clarify roles and responsibilities relating to the scheduling, conduct, evaluation, and documentation of facility-level emergency drills and exercises. The revised BJC-EP-3021, *Emergency Management Organization Program*, will serve as the closure record.

- Action #2 (BJC). Revise Exhibit I, Attachment A, of the EnergySolutions subcontract to include deliverables as required by the revised BJC-EP-3021, *Emergency Management Organization Program Description*. The revised agreement will serve as the closure record.
- Action #3 (UT-Battelle). Revise Standards Based Management System (SBMS) procedure(s) to require that responsible line organizations conduct, evaluate, and document an annual facility-level exercise for each occupied UT-Battelle facility that has an EPHA. The revised SBMS procedure(s) will serve as the closure record.
- Action #4 (UT-Battelle). Provide training to staff required to conduct, evaluate, and document annual facility-level exercises for occupied UT-Battelle facilities that have an EPHA. The lesson plan and training attendance sheets will serve as closure records.

#### **E.4 Observations**

BJC revised BJC-EP-3201 and renamed the procedure BJC/OR-3181. Section 4.3 of this new document contains the appropriate requirement for an annual facility-level exercise at BJC hazardous material facilities, as well as clear responsibilities for planning, scheduling, evaluating, and documenting the conduct of exercises. The procedure requires the submission of an exercise evaluation report to DOE within 30 working days of exercise completion. BJC enters issues and corrective action plans into the BJC corrective action tracking system. Exhibit I, Attachment A of the EnergySolutions contract was revised to incorporate the requirements of the revised BJC procedure.

UT-Battelle revised five SBMS procedures. Collectively, the revised procedures provide annual facility-level exercise instructions; separate templates for planning, documenting, and reporting results in after-action reports (AARs); and instructions for developing, reviewing, and updating emergency preparedness documentation. The contents of these procedures appropriately cover annual facility-level exercises and allow the use of site exercise procedures when desirable. Eleven exercise coordinators have completed training covered by Module 095526, Preparing, Evaluating, and Documenting an Annual Facility-Level Exercise.

Facility-level AARs are on file for all EPHA facilities except for Buildings 3047 and 7900. Building 7900 was selected for a site-level exercise and was evaluated by UT-Battelle and the AAR for the Building 3047 exercise has not been completed (the exercise was held in December 2010). The available facility-level AARs for 2010 were found to be based on abnormal operating scenarios (loss of normal power, a 1-liter spill of leachate that was screened out of the EPHA, and a fire drill), rather than on hazardous material releases. Thus, although BJC performs facility-level exercises annually, the scenarios often do not include hazardous material releases.

#### **E.5 Overall Conclusion**

Overall, corrective actions were taken to meet the goals of the corrective action plan, although there was some deviation from the initial set of identified deliverables. Facility-level exercises are being conducted at occupied ORNL buildings with EPHAs; however, the drill scenarios do not always involve hazardous material releases and thus provide only a limited opportunity to practice and evaluate Operational Emergency responses as intended by DOE Order 151.1C.

## **E.6 Recommendations**

Consider using hazardous material release scenarios that will initiate an Operational Emergency response for the facility-level exercises at facilities with an EPHA. To optimize the usefulness of the exercises, use hazardous material release quantities that will result in classifiable emergencies.

## APPENDIX F

### Status of 2008 Finding #5

#### F.1 Finding Statement

The DOE ORO process for implementing the training program for joint information center (JIC) personnel does not ensure that the JIC cadre is consistently and fully trained, as required by the *Oak Ridge Reservation (ORR) Emergency Public Information (EPI) Plan* and DOE Order 151.1C.

#### F.2 Summary of Issues Leading to Finding

Although ORO has developed a comprehensive EPI program with an appropriate structure for training and qualification for the ORR and JIC cadre, weaknesses in training program implementation resulted in inconsistent training for the JIC cadre and did not ensure that members of the cadre were proficient:

- Training provided by different contractors was not standardized.
- ORO did not consistently provide specialized training courses to the JIC cadre, and the training for key positions, such as telephone operators and spokespersons, was sporadic.
- JIC training courses were not coordinated with the contractor program managers or their training organizations. As a result, the contractors could not ensure the availability of all appropriate members of the JIC cadre for all ORO training.
- There is no requirement to demonstrate cadre member's understanding of and proficiency in their tasks before assignment to the cadre.

#### F.3 Summary of Corrective Actions

The specific actions that were developed to address this finding were:

- Action #1. ORO will develop JIC training products to ensure consistent training for JIC members, revise EPP 103 to reflect this responsibility, and expand the emergency response organization (ERO) training requirements matrices to include the JIC positions filled by the site contractors.
- Action #2. ORO will incorporate demonstration of proficiency into the ERO training documentation forms used to record required JIC training.
- Action #3. ORO will formalize a process that is documented in EPP 103 to ensure new that ERO training is provided to applicable ERO members and incorporated into initial training.

#### F.4 Observations

While the finding was based on documents and input from multiple contractors, this HSS review of corrective actions was limited to document reviews and input from only one contractor. Almost all issues listed in the 2008 inspection report have been addressed in the revised ORO training program. The following actions were completed:

- JIC training products were revised for concept of operations, notification system guidelines, and JIC facility/position orientation lesson plan.
- EPP 103, *ERO Training Program Procedure*, was revised and is now known as EMT/ADM/1, *ERO Training Program*.
- ERO training requirements matrices were revised.
- A demonstration of proficiency was added to the ERO training documentation forms, and responsibility for the proficiency requirement was assigned to the site contractors.

ORO convened a meeting of the ERO Training Working Group to discuss and present the programmatic changes that were made to address the EPI training finding, and ORO committed to developing a video to train new telephone bank operators. ORO hired a contractor to work on the video, but it has not yet been developed. The revised training matrix does not require telephone bank cadre video training.

Some members of the cadre attended spokesperson training in 2009, although this training was not coordinated with UT-Battelle. ORO does not consider spokesperson training a requirement because all spokespersons at ORNL are public affairs professionals.

#### **F.5 Overall Conclusion**

The JIC training program has been improved by ensuring that the JIC cadre can be consistently and fully trained. Completing the training video for the contractor telephone bank cadre (and reinstating the requirement for such training) will fully address the finding.

#### **F.6 Recommendations**

To continue to improve JIC cadre training, ORO should consider the following actions:

- Continue to coordinate all training with the site contractors' training points of contact.
- Finish developing and distribute the compact discs containing specialized training for telephone operators.
- Reinstate the requirement for telephone operator training into the training matrix.
- Confer with all ORR contractors to ensure that anyone who would be called upon to serve as a spokesperson during an incident has completed spokesperson training.

## APPENDIX G

### Status of 2008 Finding #6

#### G.1 Finding Statement

During limited-scope performance tests, ORNL consequence assessment teams (CATs) did not consistently produce accurate and timely initial assessments and did not provide consequence assessment projections that ensured appropriate protective action decision-making, as required by DOE Order 151.1C.

#### G.2 Summary of Issues Leading to Finding

The Computer Assisted Protective Action Recommendation System (CAPARS) is the primary modeling software used by the CAT modelers, but CAPARS did not contain an explosive release algorithm. As a work-around, the modelers produced a plume plot projection utilizing a 1-minute fire release that resulted in much greater protective action distances than those indicated in the respective EPHA and EAL. The archived predetermined consequence analysis scenario files in CAPARS, as well as the source term reference manual in the CAT room, were out of date. The CAT modelers did not have a method to quickly and accurately calculate a source term. Finally, weaknesses in dispersion modeling proficiency were distinctly evident and adversely affected the modelers' ability to formulate protective actions based on updated and refined consequence assessment data when provided.

#### G.3 Summary of Corrective Actions

To correct these issues, the EMD developed and implemented the following corrective actions:

- Contract with the developer of the CAPARS software to develop an explosive-release algorithm and update the software.
- Develop and issue a procedure on the maintenance of the ORNL site plume modeling casebooks.
- Provide specific training to CAT personnel and ensure their proficiency.
- Contract with the developer of the CAPARS software to program the software to convert volume to mass and vice versa (e.g., gallons to grams, or grams to gallons) for ease of use during an emergency event.

#### G.4 Observations

Emergency management personnel demonstrated the use of the new explosive-release algorithm for Independent Oversight. The updated software ensures that CAT modeling personnel have the capability to perform explosive release analyses. The update also gives the modeler options to enter the quantity and type of explosives or to choose the size of the explosive device (taken from the Alcohol, Tobacco, and Firearms explosive card). Further, the CAPARS developer provided a new instruction document for the modelers that specifies the appropriate steps for modeling explosions with the software. Emergency management personnel ensured that CAPARS is capable of providing plume modeling for all the initiating events provided in the ORNL EAL documents.

Emergency management personnel ensured that up-to-date information is available in the CAT room. Personnel updated the ORNL site plume modeling casebooks to include information sheets for the worst-case scenario for each facility and updated the CAPARS software to include the new casebook parameters. Additionally, EMD developed and issued a procedure, *Plume Modeling Casebook Development and Maintenance*, on the development and maintenance of CAPARS input data for the ORNL site plume modeling casebooks.

Emergency management personnel revised training documentation and provided training to specific CAT personnel. EMD took the following actions to ensure CAT personnel proficiency in their individual ERO positions:

- EMD revised the *ORNL Emergency Management Training Program Plan* to include a definition for specialized team training requirements for the CAT and the field monitoring team.
- EMD revised the *ORNL ERO Position-to-Training Requirements and Recommendations Matrix* to include training modules on EPHA content and format; plume modeling casebook development, content, and format; and practice sessions in plume modeling for appropriate ERO positions.
- EMD developed a training module on EPHA content and format.
- EMD training personnel provided training to consequence assessment managers, meteorologists, and CAT modelers on EPHA content and format and plume modeling casebook development, content, and format. A proficiency exam was administered at the end of the training.
- EMD training personnel provided training to meteorologists and CAT modelers that included sessions to practice plume modeling and the use of plume modeling tools. Real-life scenarios were developed that make the modelers use all the tools available to them.
- EMD requires biannual specialized team training for the consequence assessment manager, meteorologists, and CAT modelers to ensure that they retain proficiency in their individual ERO positions. New lesson plans are developed each year on different aspects of CAT duties for the biannual training.
- EMD CAT personnel receive additional training during exercises conducted each year, and they participate in at least two exercises per year.

Finally, emergency management personnel demonstrated the new CAPARS software's capability to convert volume to mass. The personnel observed by Independent Oversight identified concerns with the conversion algorithm in the software because it does not give the modelers a useful tool to quickly and accurately calculate a source term (an issue identified in 2008). CAPARS was initially developed using algorithms that required the input of source term values as grams, and the new conversion algorithm does not adequately remove this requirement. For example, CAT modelers have to take time to look up chemical density values in order to convert from grams to volume values or vice versa. Further, although CAPARS allows the modelers to input the source term values for radioactive materials in a number of units (e.g., grams, curies, becquerels), the output values are always given in grams. Emergency management training personnel self-identified that the modelers are not confident about the radiological output results because the results are given in grams rather than the initial input value (e.g., curies or becquerels), and the modelers must take the time to calculate the output dose consequence values in the

units that were input (e.g., converting from grams to curies) to ensure the accuracy of the output projections.

## **G.5 Overall Conclusion**

Incorporating an explosive-release and conversion algorithms into the CAPARS software, developing the *Plume Modeling Casebook Development and Maintenance* procedure to ensure up-to-date information in the plume modeling casebooks, and providing training and proficiency testing to the CAT personnel have effectively addressed most of the weaknesses identified in this finding. EMD completed the deliverables identified in the corrective action plan for this finding and appropriately closed the finding. However, users identified concerns about the CAPARS conversion algorithm. Further, emergency management training personnel self-identified that modelers are not confident about the radiological dose consequence outputs given because the results are given in grams rather than the input units (e.g., curies or becquerels).

## **G.6 Recommendations**

To continue to enhance the consequence assessment capability, consider the following actions:

- Have CAT modelers conduct timely initial assessments with the same software used in the consequence analyses conducted in the EPHA, as recommended in the *U.S. Department of Energy Emergency Management Guide*.
- Contact the CAPARS developer to:
  - Determine whether the density values for site-specific chemicals can be added into the conversion algorithm for ease in converting from grams to other mass or volume values.
  - Update the radiological algorithm to generate output values in the same units as those input into the model.



## APPENDIX H

### Status of 2008 Finding #7

#### H.1 Finding Statement

The DOE ORO has not conducted full assessments of the contractor emergency management and self-assessment programs for environmental projects at ORNL, as required by DOE Order 151.1C.

#### H.2 Summary of Issues Leading to Finding

The approved FY 2008 reviews of the emergency management programs for all three ORNL environmental management (EM) contractors (Isotek Systems, LLC; Bechtel Jacobs Company, LLC; and EnergX TN, LLC) were cancelled primarily due to resource issues. An ORO causal analysis determined that although internal ORO procedures and DOE Order 151.1C dictate the AMEM's participation in emergency management elements, including assessments, the associated roles and responsibilities were not well understood. Additionally, the DOE responsibilities for EM activities had not been subjected to a self-assessment, contributing to the lack of assessments.

#### H.3 Summary of Corrective Actions

The corrective action plan described the actions to be taken and defined the closure records. The corrective actions included ORO completing triennial reviews of all three AMEM contractors, scheduling and conducting ORO self-assessments, developing lessons learned for planning assessments, and assigning responsibilities for conducting DOE Order 151.1C required assessments to an ORO position. The specific actions and deliverables assigned to ORO were:

- Action #1. Conduct emergency management triennial reviews for all three AMEM contractors operating at ORNL. The assessment reports will serve as closure records.
- Action #2. Schedule and conduct an emergency management self-assessment annually. In lieu of an AMEM self-assessment in FY 2009, the AMEM has scheduled and will assess AMEM implementation of DOE requirements under DOE Order 151.1C. Thereafter, assure that annual EM program self-assessments are included on the AMEM assessment schedule. The final report of the AMEM emergency management assessment of AMEM implementation of DOE requirements under DOE Order 151.1 C will serve as the closure record.
- Action #3. Develop a lesson learned that addresses planning of assessments to achieve desired purposes. Corrective action database inputs will serve as a closure record.
- Action #4. Maintain a position within the AMEM organization with the responsibility for ensuring the AMEM organization's compliance with DOE Order 151.1C requirements. A record of the assignment will serve as closure evidence.

#### H.4 Observations

Independent Oversight's observations, listed below, were based on the closure evidences files. EM and ORO did not participate in this review to enable further evaluation of all corrective actions taken or to obtain additional ORO records, as previously agreed upon by Independent Oversight, the DOE ORNL Site Office, and ORO.

- Action #1. The closure evidence file does not contain the assessment reports but does contain the transmittal memo for the reports. Therefore, evidence for the adequacy of the triennial reviews and assurance of their future conduct is inconclusive.
- Action #2. The closure evidence file does not contain the assessment report on the implementation of DOE Order 151.1C requirements but does contain the transmittal memo for the report. Further, there is no clear linkage between the report and the scheduling of future self-assessments. Therefore, evidence for the adequacy of the self-assessments and the mechanisms to ensure future self-assessments is inconclusive.
- Action #3. The closure evidence file provides a web-based screenshot link to the corrective action database, but the link was inaccessible during this review. Therefore, the quality of the lessons learned could not be ascertained.
- Action #4. The closure evidence file contains meeting minutes that document the assignment of responsibility for conducting the assessments to an ORO subject matter expert. However, the named ORO subject matter expert no longer works for ORO.

## **H.5 Overall Conclusion**

The closure evidence files do not provide all the specified closure documents identified in the corrective action plan, and the records that are included do not provide assurance that the scope and depth of the triennial reviews were sufficient, that self-assessments were performed, or that the performance of these reviews will continue. Based on the limited scope of this review, the effectiveness of these corrective actions is inconclusive.

## **H.6 Recommendations**

To improve corrective action plans and evidence of corrective action implementation, consider the following:

- Provide a copy of the deliverable stated in the corrective action plan for the closure evidence file, such as reports and lessons learned.
- Provide evidence of future periodic tasks, such as triennial reviews and self-assessments, through approved program documents, such as plans, procedures, or manuals, that identify roles and responsibilities and published schedules.
- Establish responsibilities in a program manual or procedure by position instead of by name.

## APPENDIX I

### Status of 2008 Finding # 8

#### I.1 Finding Statement

The DOE Office of Science (SC) has not implemented effective corrective actions to ensure that periodic evaluations of the ORO and ORNL emergency management program are performed, as required by DOE Order 414.1C, *Quality Assurance*, and DOE Order 151.1C.

#### I.2 Summary of Issues Leading to Finding

The 2008 inspection identified that one finding from the 2005 inspection, which stated that SC did not conduct periodic assessments of the ORO and ORNL emergency management programs, was closed without implementing an effective corrective action. Subsequently, through the Office of Science Management System (SCMS), SC established a framework for executing its oversight responsibilities, both at HQ and at the sites. Under the Deputy Director for Field Operations (DDFO), the DOE SC Environment, Safety and Health Division (SC-31.1) provides oversight of the ORO and ORNL emergency management programs. The corrective action for the finding committed to developing an oversight program for the ORO and contractor programs that would ensure review of the programs every three years. This finding was closed by the SC Office of Safety, Security and Infrastructure (SC-31) and was found to be satisfactory during the effectiveness review, after SC developed an integrated assessment schedule that included an assessment of ORO for FY 2008. However, this assessment was not performed.

#### I.3 Summary of Corrective Actions

SC's causal analysis for the finding concluded that the 2005 corrective action was based on the prior model and was no longer consistent with the SC oversight program. When corrective actions for the 2005 review were established, SC was in the midst of a complex-wide restructuring and reengineering project called OneSC. As part of this effort, SC was developing a comprehensive standards-based management system called SCMS to provide a high-level description of SC's responsibilities, the associated authorities it operates within, and its management approaches.

The OneSC effort and SCMS development are now complete, as identified in SC's causal analysis. SC has clear lines of authority for oversight based on DOE Order 226.1A, *Implementation of DOE Oversight Policy*. SC's broad oversight program is described in SCMS in the Quality Assurance and Oversight Management System. Specific requirements related to evaluations of emergency management programs are captured in the SSEMMS.

SC indicated in the causal analysis that it currently uses the complex-wide *Integrated Assessment Schedule* to schedule formal assessments of contractor activities, including emergency management programs. The intent of the *Integrated Assessment Schedule* is to document a three-year rolling assessment schedule. The assessments conducted by the DDFO are provided in the *Annual Performance Plan*. Two corrective actions were identified to address the 2008 finding:

- Action #1 (SC). Evaluate SC sites' emergency management programs. The DDFO will conduct an appropriate level of evaluation at least triennially to oversee and ensure the adequacy of the emergency management programs of field elements, consistent with DOE Order 151.1C. The Associate Director, SC-31, will track this action to completion in the DOE HQ corrective action tracking system.

- Action #2 (SC). Evaluate applicable SCMS elements for consistency. Appropriate management systems and subject areas within SCMS will be evaluated to ensure the commitment for DDFO evaluation of emergency management programs is documented. The Associate Director, SC-31, will track this action to completion in the DOE HQ corrective action tracking system.

#### **I.4 Observations**

SC plans to complete action #1 by September 30, 2011. Nonetheless, SC has not yet performed an evaluation of the ORNL emergency management program, consistent with DOE Order 151.1C. SC has completed action #2. The Acting Director for SC-31.1 evaluated the appropriate documentation in SCMS to ensure that the commitments for the DDFO evaluation of emergency management programs were documented. The evaluation resulted in one finding and one recommendation, both related to the oversight of emergency management within the DDFO's office at SC HQ. The DDFO approved the completion of action #2 based on this evaluation.

SC-31.1's evaluation confirmed that the responsibility for evaluating emergency management programs every three years was not specifically stated in SSEMMS. Additionally, the *SCMS Management System Description* did not specifically require the evaluation of emergency management programs every three years as required by DOE Order 151.1C; the evaluation concluded that the lack of a specifically stated responsibility has led to emergency management HQ self-assessment functions not being performed as required. Lastly, the SSEMMS was revised to include the requirement for the DDFO to assure that emergency management programs within SC, at all levels, are evaluated every three years as required by DOE Order 151.1C.

#### **I.5 Overall Conclusion**

Independent Oversight agrees that SC correctly concluded that the lack of a specifically stated responsibility for evaluation of emergency management programs every three years, as required by DOE Order 151.1C, led to emergency management HQ self-assessment functions not being performed. The SSEMMS was revised to include the requirement for the DDFO to assure that emergency management programs within SC, at all levels, are evaluated every three years. The DDFO did not assess the ORNL emergency management program in FY 2009 or 2010; however, the completion of the remaining corrective action (evaluate SC sites' emergency management programs) is not planned until September 30, 2011. In addition, the ORNL Site Office effectiveness review for the other seven 2008 findings has not yet been scheduled, pending completion of this one remaining corrective action.

#### **I.6 Recommendations**

To improve the effectiveness of the SC assessment program, consider the following actions:

- With the DDFO, establish the dates for the ORNL emergency management program assessment for FY 2011.
- Proceed with scheduling and completing the effectiveness reviews for the other seven 2008 findings. Upon completion of action #1, schedule and complete the effectiveness review for Finding #8.

## APPENDIX J

### Building 3544 Spill After-Action Report

#### J.1 Building 3544 Spill Event Description

On August 18, 2009, at approximately 0700, a 5000-gallon tanker truck arrived at the Process Waste Treatment Facility, Building 3544, with 4042 gallons of nitric acid (65% concentration). Building 3544 is part of the Liquid and Gaseous Waste Operations Project, operated by BJC, with work performed by EnergySolutions, a subcontractor to BJC. Nitric acid is used to regenerate strong acid cation exchange columns, which remove strontium-90 from the wastewater. At approximately 0800, the tanker truck began unloading operations. At 0900, EnergySolutions' chemical operator foreman notified the backup facility manager (FM) that the receiver tank level indicator for the L-14 acid tank, a 7000-gallon stainless steel tank for storing the nitric acid used in the regeneration process, was no longer increasing. The level indicator read approximately 86%. During filling operations, there was no indication that the nitric acid tank was overfilled; however, acid flowed into the tank off-gas piping, scrubber, and filter housing. An estimated 150 gallons overflowed from the tank. Water was used to flush the excess acid out of the tank's piping system, and the solution was drained into the facility containment S-1 sump. A caustic ingredient was added to the solution to increase the pH in the sump. Indications are that the acid flowed from the scrubber into the drain system, thus releasing fumes into the facility.

At approximately 0905, a UT-Battelle maintenance worker, who had been in the facility performing a hoist inspection, reported coughing and breathing difficulty to his supervisor once they left the building after completing their inspection. The UT-Battelle employee and supervisor went to the UT-Battelle ORNL medical facility. The worker who reported symptoms was treated and released without work restrictions. The supervisor was evaluated and released without treatment.

Around 0930, the backup 3544 FM was notified that the UT-Battelle personnel had reported to the ORNL medical facility. The backup FM subsequently notified the primary FM, who proceeded to the site. The BJC subcontract coordinator was notified around 1000, reported to the facility, and later notified the BJC Liquid and Gaseous Waste Operations Project manager; the BJC waste management manager of projects; the BJC field services area manager; the BJC waste management environment, safety and health supervisor; the DOE Facility Representative; and the DOE project manager.

At 1015, the Building 3544 FM observed a plume coming from the 3544 outside ventilation stack and initiated steps to shut down the facility ventilation system. Securing the ventilation system did not immediately dissipate the plume. At 1036, the backup FM notified the LSS, and at 1047 the LSS declared an Operational Emergency not further classified. The LSS ordered personnel in Building 3544 to evacuate and advised the remainder of the laboratory to avoid Southside Avenue. Also at 1047, the Fire Department was dispatched to report to the scene. At approximately 1106, a shelter-in-place order was issued to the site population. Other resources dispatched included emergency medical services, the protective force, the emergency spill response team, and various operations support personnel, such as the shift radiological control technician and industrial hygienist.

At 1102, the LSS made verbal notifications of the Operation Emergency to Oak Ridge Operations Center, DOE HQ, ORNL EOC, and TEMA. The ORNL EOC was declared operational, and laboratory emergency director duties were transferred from the LSS to the crisis manager in the ORNL EOC at approximately 1115.

The DOE ORO EOC (OROEEOC) was operational at 1111 and prepared and issued three news releases. The OROEOC public information officer and EPI writer issued the first news release to the media at

1140. Calls were received from the Knoxville News Sentinel and WBIR. The OROEOC manager contacted and briefed the TEMA director. DOE HQ Office of Environmental Management and SC senior program staff were notified.

The lab-wide shelter-in-place order was downgraded at 1143, while buildings near Building 3544 remained in a shelter-in-place status. At the instruction of the EOC, the five EnergySolutions workers who were in Building 3544 during the actual event were evaluated at BJC health services; they were released after the evaluation, with no restrictions and no required follow-up. The emergency spill response team initially entered Building 3544 at 1302 under an approved hazardous material (HAZMAT) action plan to open a valve (allowing nitric acid to drain into the sump) and take air samples. The team members exited the building at 1324 and were decontaminated. A second HAZMAT action plan was developed to conduct draeger tube readings outside the building; the plan was approved at 1348 and was implemented at approximately 1400. All readings taken outside Building 3544 were below detectable limits, indicating that no nitric acid vapors were present.

The recovery plan was developed in the ORNL EOC and approved by the crisis manager at 1411. The Operational Emergency was terminated at 1416, and the facility was turned over to the BJC recovery manager. All vehicles in the south parking lot were held until 1530 in order to inspect and document the vehicles present. Some vehicles were tested with pH strips and visually inspected to determine whether the material released in the plume caused any damage. The nitric acid liquid release was contained within the off-gas piping, scrubber, and filter housing. The plume release from the ventilation stack dissipated within 30 minutes of being observed, and the estimated release was below reportable quantity levels of 1,000 pounds for pure nitric acid compounds. After examination of these facts, it was concluded that no significant environmental release or impact resulted from this accident.

## **J.2 Summary of Building 3544 Spill After-Action Report Issues**

UT-Battelle documented 13 opportunities for improvement (OFIs) in the Building 3544 AAR. Corrective actions assigned to UT-Battelle (11 OFIs) are tracked under Assessment and Commitment Tracking System assessment number 12523. Actions for which ORO (two OFIs) and BJC (one OFI) are accountable are tracked separately by the responsible organization. Important response issues identified by UT-Battelle are as follows:

- BJC did not contact the LSS office to report an abnormal condition at Building 3544 until more than 90 minutes after the spill was identified.
- Multiple facilities reported that the public address system announcements were difficult to comprehend and sometimes confusing.
- Communication to employees during the event was not sufficient. Concerns were raised that the site occupants knew less about the event than the local media.
- The LSS used the pre-defined shelter-in-place action in an attempt to control the movement of people around the laboratory. Shelter-in-place is intended to be a protective action in response to a HAZMAT release, but a number of inconsistencies developed in the implementation of that action (e.g., the protective force allowed personnel to enter the site).
- Facility personnel in a limited number of facilities had difficulty in securing the ventilation systems during the shelter-in-place, and some concerns about electrical safety were expressed.

- The OROEOC was not the sole source of information for media and DOE HQ.

### J.3 Observations

Overall, the Independent Oversight review found that the completed and/or scheduled corrective actions for most UT-Battelle Building 3544 AAR OFIs adequately addressed the associated issues. All of these issues addressed performance weaknesses in emergency response. Although performance testing was not within the scope of this review, most programmatic improvements to address performance issues should be effective if implemented as written. Independent Oversight also determined that the OFIs assigned to UT-Battelle for the Building 3544 AAR were adequately addressed.

Although UT-Battelle has taken further actions since the Building 3544 event, the completed corrective actions did not fully address OFI #1. A few issues remain, related to event discovery and identification. For example:

- UT-Battelle identified that the initial emergency response to the Building 3455 acid spill was marginal, given that the LSS should have been notified when the initial overfill occurred, or at least when the material release from the stack was recognized. However, the LSS was not notified of the spill until approximately 90 minutes after it occurred, and 20 minutes after the plume from the stack was first observed. The AAR identified that the recorded time of event discovery was 1041 followed by event categorization at 1047. Independent Oversight concluded that the Building 3544 initial event notification form, *DOE HQ Situation Report*, and news releases did not reflect the actual time of event discovery – i.e., 0900, when the EnergySolutions chemical operator foreman became aware of the abnormal event, as recorded on the BJC Occurrence Report. The delayed notification to the LSS did not allow the LSS to meet the requirement of DOE Order 151.1C that an event must be categorized as an Operational Emergency as promptly as possible, but no later than 15 minutes after event recognition/identification/discovery. This timeliness requirement is intended to ensure that actions to protect workers and the public are taken as quickly as possible.
- UT-Battelle procedure LPD-EM-ADM-0410, Rev. 4, *Event Categorization and Classification*, appropriately captures the DOE order requirement for event categorization. However, the procedure incorrectly defines discovery as “when the LSS is notified by facility personnel or alarm,” rather than when employees and subcontract personnel in a facility discover an event that results in, or could result in, the declaration of an emergency.
- The ORNL Emergency Plan requires all employees to notify the LSS of abnormal or emergency events in accordance with their facility/building local emergency manual (LEM). Consistent with the LEMs, the initial event information must include, as a minimum, the location of the event; a description of the event, including the possibility of a HAZMAT release; and the identification of possibly injured or contaminated persons. Section 7.2.1.4 of the emergency plan, *Reporting an Emergency*, of the emergency plan further states *when an emergency occurs, the person(s) discovering the emergency must accept responsibility for reporting the incident. The person discovering the emergency should take mitigating actions if these actions can be accomplished without compromising his safety or the safety of others. Reporting the emergency will initiate emergency response and protective actions. The person reporting the incident will meet any emergency response personnel to provide information about the incident.* However, personnel in Building 3544 did not promptly notify the LSS following discovery of the abnormal event. Interviews with UT-Battelle personnel indicate that personnel in Building 3544 did not consider the abnormal event to have the potential to result in an emergency declaration. Independent

Oversight observed that the Building 3544 LEM does not contain information on the notification of abnormal events to the LSS. Furthermore, a sampling of other BJC LEMs revealed that methods to enhance detection and recognition of emergencies and transition to emergency operations are not appropriately integrated with routine operating practices. Importantly, the transition to emergency operations relies on recognition of specific indications or symptoms of an abnormal event or emergency condition. LEMs do not discuss monitoring of various indications and recognition of abnormalities and their safety significance; this lack of important information likely contributed to the perception that the Building 3544 event was not an emergency situation.

As identified by the EMD, UT-Battelle does not track the completion of corrective actions for OFIs that are not assigned to UT-Battelle. Thus, UT-Battelle may not know when necessary improvements are delayed or not implemented. For example, BJC was assigned a key corrective action to prevent recurrence of the issues associated with the Building 3544 event discovery and identification (revision of the *BJC Park Worker Training* module to ensure that training defines the requirement for reporting abnormal events and emergencies and explains the difference between an emergency and abnormal event). UT-Battelle was not aware of whether this action had been completed.

The AAR acknowledged that a few communications issues in providing event information to workers and the media occurred during the Building 3544 event. For example, some concerns were raised about the clarity and content of the public address system announcements and the frequency of communications to employees. In addition, there was not a sole source for media interactions and event reporting. Other UT-Battelle AARs have also documented some problems with providing accurate and timely emergency information. A contributing factor to these problems was likely the operational structure between the EOCs (ORNL EOC and OROEOC), which share the responsibility for timely information flow to keep workers and the public informed, dispel rumors, and provide essential health and safety information. This divided responsibility increases the potential for the dissemination of confusing, conflicting, and erroneous information.

#### **J.4 Overall Conclusion**

The Building 3544 event demonstrated that UT-Battelle initial decision-makers can effectively assess an emergency event and quickly determine and communicate the actions needed to protect site workers and the public. These strengths reflect continued attention and improvement in the training, drill and exercise programs that maintain ORNL responder proficiency. However, the facility's event notification to the LSS was not timely (90 minutes after the event occurred) and did not satisfy the time-sensitive requirement to provide the information necessary to initiate a variety of response actions. This event also highlighted some OFIs related to lead and event contractor understandings and interactions. Lastly, improved communication processes would streamline emergency information flow, help keep workers and the public informed, provide essential health and safety information, and reduce the potential for the dissemination of confusing, conflicting, and erroneous information.

#### **J.5 Recommendations**

To enhance ORNL's ability to respond to emergencies, consider the following actions:

- Ensure that all event contractors and subcontractors are required to comply with the ORNL emergency plan.
- Add specific information to the ORNL emergency plan related to UT-Battelle requirements for event contractors (e.g., support for incident command and site response, including event



categorization and classification, occurrence reporting, worker protection, mitigation, and technical support).

- Improve the timeliness of event reporting (by employees and subcontract personnel in a facility) to the LSS for events that could cause the declaration of an emergency.
- Consider verification that facility-specific abnormal events that may result in an emergency declaration are in accordance with the LEM template (section FP-03).
- Revise procedure LPD-EM-ADM-0410, *Event Categorization and Classification*, to clarify that event discovery is when an abnormal event is recognized/identified/discovered by facility personnel or the LSS.
- Given the distinctive lead and event contractor concept of operations, implement a process to ensure that EMD tracks to completion any non-UT-Battelle corrective actions key to emergency planning, preparedness and response.
- To improve the time issuance of news releases and employee communications, minimize the number of key individuals involved in review and approval.

## APPENDIX K

### Building 7920 After-Action Report

#### K.1 Building 7920 Event Description

On May 2, 2009, at approximately 0411, Building 7920 started a transfer operation. At 0420, the Radiochemical Engineering Development Center control room received a high-level continuous alpha air monitor (CAAM) alarm in the decontamination glovebox room, followed by three subsequent CAAM alarms at 0421, 0422, and 0423. Processing activities were immediately terminated, and the LSS was notified at 0425. At 0440, the radiological control technician (RCT) asked the LSS to report to Building 7920. The LSS arrived at 0455. At 0458, the shift RCT prepared to enter the transfer area to determine whether the CAAM reading was elevated. At 0506, (before the RCT entered the area), a high-level CAAM alarm in the transfer area automatically activated the Building 7920 evacuation system, which activated the facility radiation monitoring system alarm on the laboratory emergency response center data acquisition system in the LSS office. No employees were contaminated.

At 0506, the LSS returned to the LSS office and at 0527 categorized the event as an Operational Emergency not requiring classification. The LSS then paged management personnel, paged the EOC cadre to report, and performed notifications to offsite officials at 0548.

At 0635, ORNL local emergency director duties were turned over to the crisis manager. Roadblocks were established, and at 0644 a shelter-in-place announcement was made for Buildings 7900, 7930, 7910, and 7600. Incident command advised that the RCT took readings around the exterior of the west side of Building 7920 indicating 1650 disintegrations per minute (dpm) beta and 355 dpm alpha. The RCT reported that there was no release outside the building. Subsequent readings at 0654 were reduced to 909 dpm beta and 195 dpm alpha, and at 0821 air samples indicated no long-lived radioactivity. After confirmation that no radioactive material was released from the facility, a reentry plan was developed. At approximately 0930, reentry to Building 7920 control room confirmed that no additional monitors had alarmed. No removable contamination was identified in the control room or boundaries to the limited access area, transfer area, and decontamination glovebox area. The control room was remanned, and all safety systems were verified to be operational. At approximately 1030 hours, two of the CAAMs automatically reset and subsequently confirmed that airborne radioactivity levels had returned to normal, indicating that the initiating event was over.

The Oak Ridge Operations Center notified Oak Ridge Methodist Medical Center of the event at 0620 and issued an initial news release. The OROEOC was declared operational at 0648 and issued news releases at 0730, 0942, and 1405. E-mails were sent to DOE HQ, Office of Environmental Management, and senior program staff because it was a Saturday and home and cell telephone numbers were not available. Emergency notification e-mails were not sent to employees on site and at the Federal Building complex because it was Saturday.

#### K.2 Summary of Building 7920 After-Action Report Issues

The AAR identified 21 OFIs, 15 assigned to UT-Battelle and 6 to ORO. The UT-Battelle issues were entered into Assessment and Commitment Tracking System (ACTS); 14 of the OFIs are closed, and 1 OFI remains open awaiting completion of required training by ORO. The ORO issues were not entered into ACTS, but the AAR indicated that five of the six OFIs were closed and that the due date for the remaining OFI (regarding contact information for DOE HQ senior program staff is “to be determined”).

### **K.3 Observations**

UT-Battelle identified the initial emergency response as satisfactory, with three minor negative observations that did not warrant OFIs. Two of these minor observations could involve health and safety (i.e., the AAR identified a time lag between the event initiation and activation of the incident command system, and the LSS did not change the meteorological tower board information on the best available safe route for incident command and EOC members). Nine of the 14 completed OFIs for which UT-Battelle was responsible were appropriately closed. The closure evidence for the remaining five lacked sufficient detail or did not include enough action details in ACTS to determine whether the closure was appropriate. While the lack of detail in ACTS is allowed by procedure, it allows ambiguity into the process of justifying closure.

Of particular concern, however, is how the site dealt with shortcomings in the timeliness of event categorization and the ensuing offsite notifications. The LSS did not categorize the event in a timely fashion, yet the AAR did not address this. Further, several elements that were categorized as satisfactory appeared, on further scrutiny, to be unsatisfactory. Areas of concern include:

- The failure of the initial EOC pager activation caused confusion for the ERO. The AAR treated this condition as a “sporadic isolated anomaly” and did not recommend any changes in procedures, EOC training, or the message the ERO receives when the paging system fails. However, the confusion caused by the paging system failure put additional stress on the LSS while completing time-urgent actions, resulted in only a limited number of EOC positions being filled, and required telephone calls to backfill EOC positions. In some cases, multiple ERO members responded for the same position in the EOC.
- The BJC representatives did not respond when paged.
- The ORNL EOC public affairs liaison did not arrive at the EOC until more than two hours after the event.
- As part of the offsite emergency management notifications, e-mails were sent to DOE HQ, Office of Environmental Management, and senior program staff because it was a Saturday and home and cell telephone numbers were not available.
- Emergency notification e-mails were not sent to employees and the Federal Building complex because it was Saturday.

### **K.4 Overall Conclusion**

The Building 7920 event demonstrated that since this incident happened during off hours on a Saturday, many routine emergency procedural actions were not effective. Although the LSS effectively assessed the emergency event and quickly determined and communicated the actions needed to protect site workers and the public, the LSS did not categorize the event for over an hour because the four CAAM alarms were not trusted as indicators of an event. Timely emergency notifications to onsite employees were not made because it was a Saturday; however, timely communications were established and maintained with offsite organizations and the public through news releases, and an attempt was made to notify DOE HQ via e-mails. Lastly, the AAR report did not provide an effective evaluation of the response, thus diminishing the lessons-learned process.

## **K.5 Recommendations**

To enhance ORNL's ability to respond to emergencies, consider the following actions:

- Improve the timeliness of event reporting (by employees and subcontract personnel in a facility) to the LSS for events that could result in or have the potential to cause a declaration of an emergency. Additionally, revise procedure LPD-EM-ADM-0410, *Event Categorization and Classification*, to define event "discovery" as when an abnormal event is recognized/identified/discovered by facility personnel or the LSS.
- Include copies of the original documents (e.g., notification forms and news releases) in the AAR, rather than the information that was entered into WebEOC™.

## APPENDIX L

### U.S. Department of Energy Oak Ridge National Laboratory Site Office Assessment and Issues Management Processes

#### L.1 Scope

Independent Oversight's scope for this area included a detailed review of OSO processes for assessing the contractor and OSO emergency management programs and resolving the issues identified by these assessments. The implementation of OSO assessment process for the ORNL emergency management program was examined to determine whether the process was adequately accomplished. Independent Oversight and OSO also discussed OSO's effectiveness review that is due six months after completion of the last corrective action for the findings from the 2008 Independent Oversight emergency management inspection.

#### L.2 Conclusions

OSO has suitable processes in place for self-assessments and assessments of the contractor emergency management program. The processes are appropriately documented and notably require that objective evidence be documented in sufficient detail, both to reconstruct the activity being observed and to describe the assessment logic. Additionally, SC requires the OSO assessment program to be independent of the contractor's oversight activities in order to maintain an unbiased understanding of the effectiveness of the contractor assurance system. Further, the OSO issues management process contains the steps necessary for an effective program, including preventing recurrence of findings and closing corrective actions based on standard methods. As OSO considers beginning the effectiveness review for the seven findings from the 2008 inspection that have been resolved, OSO should recognize that the evaluation criteria used for self-assessments are incomplete; the criteria are based on an OSO procedure that does not include all elements of the OSO emergency management program. In addition, OSO assessment reports do not consistently document enough objective evidence to support a determination that evaluation criteria were met and do not demonstrate that the OSO assessment is independent of the contractor's assessment activities. Furthermore, OSO has not sent one finding, which was identified over nine months ago, to the contractor for resolution.

#### L.3 Observations and Recommendations

**Observation.** OSO has established an adequate process for performing self-assessments, although some weaknesses were evident in the evaluation criteria used for the self-assessments. OSO describes the self-assessment process in two procedures, a work practice, and a 2010 self-assessment plan. The process contains most features necessary for an effective self-assessment program, including the requirement for an annual self-assessment of the OSO emergency management program and preparation of structured and documented self-assessment reports. In addition, self-assessment reports are required to contain sufficient detail to reconstruct the activity observed and describe the inspection logic, and self-assessments include performance observations. However, OSO based the evaluation criteria specified in the 2010 self-assessment plan on the OSO emergency management procedure rather than on the relevant Federal requirements in DOE Order 151.1C or DOE Guide 151.1-3, Appendix D. Consequently, the evaluation criteria do not include some areas of the OSO emergency management program, such as training and drills for OSO personnel and OSO ERO responsibilities.

**Recommendation L.1.** Enhance the OSO self-assessment program's ability to identify and correct weaknesses in the emergency management program. Specific actions to consider include:

- Modify the self-assessment evaluation criteria to include the relevant criteria from DOE Guide 151.1-3, Appendix D.
- Expand the OSO self-assessment program to evaluate OSO staff performance as an integral part of the ORNL EOC team.

**Observation. The OSO assessment process contains the steps necessary for conducting effective assessments of the contractor emergency management program, but the assessment reports do not consistently demonstrate that an adequate assessment was performed.** The OSO assessment process for the contractor emergency management program is documented in a combination of procedures and work practices and appropriately requires OSO assessments of all elements of the contractor emergency management program over a three-year period. Notable features of the assessment process include the use of qualified staff to support and participate in assessments and the requirement to document objective evidence in sufficient detail to reconstruct both the activity and the inspection logic. Furthermore, SC requires its site offices to implement an adequate assessment program that is independent of the contractor's oversight activities so that the site offices can develop and maintain a current and unbiased understanding of the effectiveness and credibility of the contractor assurance system. However, significant variations were noted in the depth and rigor of the OSO assessment reports for the contractor emergency management program over the last three years. The 2008 OSO assessment report clearly documented the evaluation criteria used for the assessment, the objective evidence used to determine that criteria were met, and the activities performed to conduct the assessment. On the other hand, the 2009 and 2010 OSO assessment reports did not document the objective evidence used to determine that criteria were met and did not discuss the specific assessment activities that OSO performed, beyond shadowing the contractor's assessment of the same topics. As a result, the OSO assessment reports did not consistently indicate the depth and rigor of the reviews or demonstrate that the assessments met the OSO requirement to document sufficient objective evidence. Further, the assessment reports did not consistently demonstrate that OSO has a current and unbiased understanding of the effectiveness and credibility of the contractor's emergency management program.

**Recommendation L.2.** Improve the OSO assessment program's ability to identify and correct weaknesses in the emergency management program. Specific actions to consider include:

- Document, in the assessment reports, the objective evidence used to determine whether evaluation criteria were met or not met.
- Provide additional written guidance and training to assessors on the standards of acceptable performance and the expected level of detail in assessment reports.
- Emphasize achieving balanced assessments that include document reviews, observation of performance for response-type evaluation criteria, and implementation of procedures and plans for programmatic-type evaluation criteria.
- Review the contractor self-assessment program in depth each year to verify that it is effective in finding and correcting deficiencies.
- Include a review of the effectiveness of corrective actions for findings identified during previous OSO assessments.

**Observation.** The OSO issues management process contains all necessary aspects for an effective program; however, the process would benefit from increased emphasis on the timeliness of transmitting issues to the contractor for resolution. OSO procedures and work practices describe the issues management process used to resolve findings identified by OSO through their contractor assessments and self-assessments. The issues management process includes several important features such as focusing on preventing recurrence of findings during corrective action development, tracking corrective actions to completion, and specifying the acceptable methods for closing a corrective action. However, OSO has not always promptly transmitted findings in assessment reports to the contractor for resolution. A priority three finding (the lowest level of finding) was identified by OSO during an EPI assessment in February 2010, but, 9 months later, has not yet been sent to the contractor for action. Therefore, no corrective actions have been developed to address the inconsistencies noted by OSO between the EPI procedure and the EPI checklists regarding the methods available for providing information to onsite personnel during an emergency.

**Recommendation L.3.** Enhance the OSO issues management process through consideration of the following specific actions:

- Clarify the expectations and deadlines for transmitting findings identified in assessment reports to the contractor for resolution.
- Emphasize the timely completion of corrective actions.

**Observation.** Commencing the effectiveness review for the OSO and contractor findings from the 2008 Independent Oversight inspection of the ORNL emergency management program is warranted, given that these corrective actions were completed in February 2010. The October 2008 Independent Oversight inspection of the ORNL emergency management program identified eight findings: five regarding the contractor organizations, one regarding the EPI support provided by the Oak Ridge Operations Office to OSO, one for OSO, and one for SC. All of the corrective actions for the findings were completed by February 2010, with the exception of one action assigned to SC, with a due date of September 30, 2011. Given the amount of time remaining before SC will complete the final corrective action, Independent Oversight discussed with OSO and the EMD the merits of conducting effectiveness reviews for the seven findings that have been resolved. (DOE Order 414.1C, *Quality Assurance*, requires an effectiveness review within six months after the last corrective action is completed, but the review can be initiated at any time.) All parties agreed that enough time had passed to enable a determination of whether the corrective actions for the seven completed findings have been effective and prevented recurrence of the findings. Initiating the effectiveness review “early” for the seven completed findings would allow identification of ineffective corrective actions much earlier and provide time for any additional actions needed before the final effectiveness review is due on March 30, 2012, per the current schedule.

**Recommendation L.4.** To improve the usefulness of effectiveness reviews, consider the following actions:

- Use a sampling methodology where appropriate to confirm that the underlying causes of an issue have been resolved.
- Use performance-related criteria to determine the effectiveness of completed corrective actions for performance-based issues, particularly key decision-making tasks.

- Document the evidence used to support conclusions regarding the effectiveness of actions in resolving the underlying issue.
- When effectiveness reviews identify continuing weaknesses, re-open the finding and add further corrective actions.



## APPENDIX M

### UT-Battelle Assessment and Issues Management Processes

#### M.1 Scope

Independent Oversight's scope for this area included a detailed review of EMD's processes for conducting self-assessments of their emergency management program and resolving the issues identified by these assessments. Independent Oversight also examined the implementation of the UT-Battelle EMD assessment and issues management processes to determine whether they were adequately accomplished.

#### M.2 Conclusions

The EMD issues management process is comprehensive and includes detailed instructions for all steps of the process. Additionally, corrective actions are assigned appropriate due dates, developed to cover all aspects of the issue and prevent recurrence, and closed properly in most cases. EMD has also established a comprehensive process for conducting self-assessments that includes appropriate evaluation criteria, performance based assessments, and an internal quality review process upon completion. However, Independent Oversight noted several areas where the assessment and issues management processes could be more effective. In a few cases, the closure evidence for a completed corrective action did not demonstrate that the action had been completed or did not describe the action that was taken. Additionally, the assessment process does not clearly describe the level of detail expected for documenting objective evidence, does not require any training for assessors, and does not clearly explain the reason for internal staff reviews of completed assessments. Furthermore, the narrative format of the assessment reports does not support linking objective evidence to particular evaluation criteria or prompt the assessor to include observations about performance or implementation of requirements.

#### M.3 Observations and Recommendations

**Observation. EMD has established a comprehensive issues management process.** The EMD issues management process is described in the ORNL emergency plan and several UT-Battelle site procedures, with detailed instructions for each step of the process. An important feature of the process is prioritizing issues into four categories that escalate the requirements for root cause analysis and formality of closure of corrective actions according to the significance of the issue. In addition, changes in corrective actions are formally managed, and higher-level management approval is needed to change the more significant issues. Corrective actions are tracked in ACTS, which sends out automatic e-mails to remind action owners and management when the due date for a corrective action is approaching or overdue.

**Observation. Timely and effective corrective actions have been implemented for most issues identified in assessment reports.** Independent Oversight reviewed a sample of corrective actions and found that most had been properly closed per UT-Battelle procedures. The due dates assigned to corrective actions were timely and reflected the severity of the issue. Additionally, most corrective actions addressed all aspects of the issue, including preventing recurrence. However, some weaknesses were noted in the closure of the corrective actions. The first weakness was that the closure evidence for a corrective action did not demonstrate that the action had been fully completed. Specifically, EMD developed a corrective action to evaluate the safety of the current assembly point location for Building 3047 and move the assembly point if necessary; the closure evidence stated that a meeting was held and it was determined that the assembly point should be moved, but EMD closed the action without relocating the assembly point. The second weakness was that the closure rationale for several issues did not fully describe the actions that were taken to resolve the issue. For example, the AAR for an Operational Emergency at Building 7920 identified 15 OFIs that EMD categorized as minor issues. Corrective

actions were developed and entered into ACTS for seven of the issues. EMD closed several of the remaining issues with the statement that an action had been completed, but without a description of what action was taken; one example is that EMD identified an issue stating that the LSS performed a management page before activating the ERO and that the process for LSS notifications should be evaluated, but EMD closed the action without providing information on the evaluation of the LSS notification process. Consequently, several issues that EMD considers to be closed (and no longer tracks) lack objective evidence of completed actions to resolve the issues.

**Recommendation M.1.** Strengthen the EMD issues management process by including more detailed criteria for determining acceptable resolution of issues. Specific actions to consider include:

- Require objective evidence for closure of all issues to demonstrate that all aspects of the corrective action have been completed.
- List the specific corrective action that is already under way that specifically covers the action needed, along with the appropriate ACTS number.
- Document the rationale if no action is taken for an issue.

**Observation.** EMD has established and implemented a comprehensive process for conducting self-assessments; however, several improvements would make the assessments more effective in identifying all of the issues requiring resolution. The assessment process described by the ORNL emergency plan and the readiness assurance procedure includes most aspects of an effective process. Positive attributes of the assessment process include annual assessments of all emergency management program elements using evaluation criteria based on Appendix D of DOE Guide 151.1-3 and the use of performance-based assessments when appropriate. In addition, the assessment process includes a review of each completed assessment by another EMD staff member. However, the assessment process does not clearly describe the expectations for documenting the objective evidence used to determine whether evaluation criteria were met. Further, the narrative format of the assessment reports makes it difficult to correlate the objective evidence with the evaluation criterion and does not prompt assessors to include observations about performance or implementation of procedure requirements. In addition, the readiness assurance procedure does not include any training requirements for assessors and does not describe the expectations for staff to review each other's assessments. As a result, inconsistencies in the depth and rigor of the assessments between EMD staff were noted, and some assessment reports did not fully document all of the objective evidence that was used to determine whether criteria were met.

**Recommendation M.2.** Enhance the ability of the assessment process to identify and correct weaknesses in the emergency management program. Specific actions to consider include:

- Document, in the assessment reports, the objective evidence that was used to determine whether evaluation criteria were met. (Independent Oversight provided an example of an alternate assessment report format to site personnel.)
- Provide additional written guidance and training to assessors on the application of evaluation criteria, the standards of acceptable performance, and the expected level of detail in assessment reports.
- Require specific training for EMD personnel who conduct assessments.
- Include a review of the effectiveness of corrective actions for findings identified during previous EMD assessments.